

Environmental and biological controls on modern lacustrine microbialite morphogenesis at Lago Sarmiento, Chile

Alessandro Airo

Geological & Environmental Sciences

Stanford University

450 Serra Mall, Bldg 320, Rm 118, Stanford, CA 94305-2115

USA

aairo@stanford.edu

Donald R. Lowe

Geological & Environmental Sciences

Stanford University

USA

From at least 3.5 to about 0.6 billion years ago, microbes were the dominant terrestrial life forms and their microfossils and build-ups, termed microbialites, provide much of what is known about the early evolution of life. We here report the discovery of large modern carbonate microbialites forming within Lago Sarmiento, a cold-climate alkaline lake in Patagonia, Chile. Due to recent drops in lake level, fossil microbialites consisting of columnar and domal types reaching a few meters in diameter and height are exposed up to 8m above the present lake level. Subaqueous actively growing microbialites host a complex and layered microbial community, and the exposed microbialites show abundant fossilized microbial remains. This occurrence is significant because of the presence of both active subaqueous and fossilized subaerial microbialites of the same kind. These microbialites provide a unique opportunity to evaluate the environmental and biological controls on microbialite morphogenesis, both today and in the ancient geologic record. Considering the ongoing exploration on Mars, it will be key to further understand which structural features distinguish abiotic chemical deposits from those that have been affected by life during their genesis.

